



## II. PROJECT PURPOSE AND NEED

### A. Location

The project area would extend 17.5 miles from northern Phoenix into New River and other unincorporated areas of Maricopa County (Figures 1 and 2). The project study area begins south of the I-17/SR 101L TI (MP 214.5) and ends at the New River Road TI (MP 232.0).

### B. Background and Overview

I-17, also known as the Black Canyon Freeway in the metropolitan Phoenix area, is a major travel route between two of the nation's principal east-west highways, connecting I-10 in Phoenix with I-40 in Flagstaff. I-17 also provides the most direct route between the Phoenix metropolitan area and several major recreational and tourist attractions in the central and northern portions of Arizona, including the Grand Canyon and Lake Powell. The 1998 Phoenix-Flagstaff-Page Corridor Study (ADOT 1998) identified I-17 as part of the key set of surface linkages that facilitate north-south movement of people and goods. This study recommended additional travel lanes and an HOV lane in each direction of I-17 within the current study area.

In addition to serving regional traffic, I-17 also serves the rapidly developing communities on the northern fringes of the Phoenix metropolitan area, extending north to New River. In recent years, Maricopa County has been among the fastest growing areas in the United States. Areas along the I-17 corridor in northern Phoenix, and north of the urban boundary, are expected to grow rapidly as new developments are constructed in the open desert, with an anticipated population increase of more than 100,000 persons. Specifically, extensive development is planned near I-17 between Happy Valley Road and Anthem Way, in areas with large undeveloped tracts of privately owned or State Trust Land managed by the Arizona State Land Department (ASLD).

### C. Purpose and Need

#### 1. General Corridor Description

The existing I-17 mainline in the area north of SR 101L consists of two 12-foot (ft) lanes in each direction, with a 10-ft outside shoulder to accommodate incident refuge and emergency stops and a 4-ft inside shoulder. The northbound and southbound I-17 lanes are separated by an unpaved median that varies in width from 60 ft between Rose Garden Lane and Happy Valley Road to 76 ft north of Happy Valley Road. The project area (Figure 3) includes 10 TIs, located at Utopia Drive/Yorkshire Drive, SR 101L (Beardsley Road), Rose Garden Lane, Deer Valley Road, Pinnacle Peak Road, Happy Valley Road, Carefree Highway (SR 74), Pioneer Road, Anthem Way, and New River Road. In addition, a new TI is currently under construction at Daisy Mountain Road. The major drainages along the roadway include Scatter Wash, Skunk Creek, the Central Arizona Project (CAP) Canal, Deadman Wash, and the New River.

I-17 crosses over SR 101L and its associated frontage roads. On northbound I-17, two general purpose lanes plus an HOV lane and auxiliary lane currently exist north of Yorkshire Drive/Utopia Drive through the main body of the TI and north of Rose Garden Lane, with short

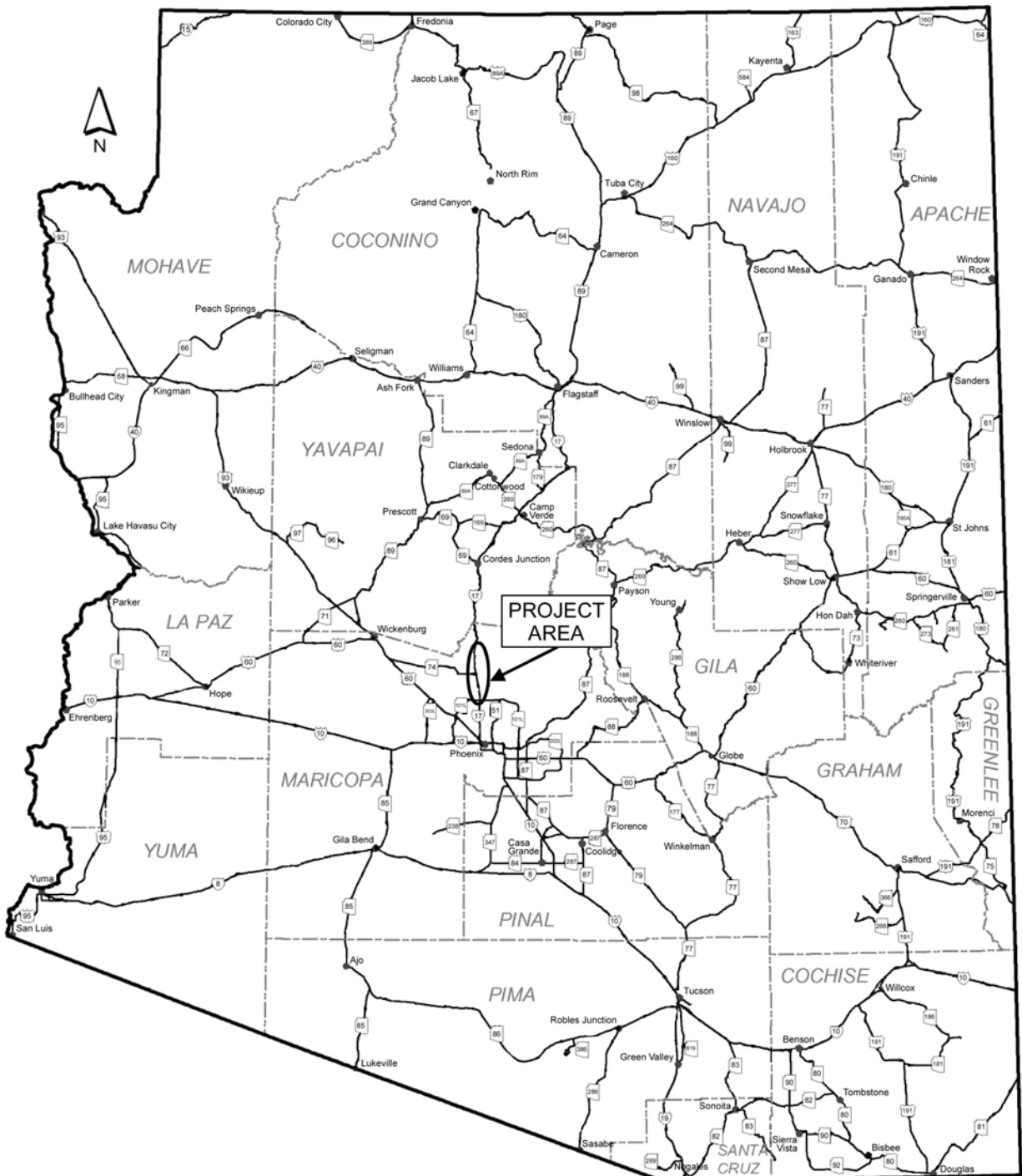


Figure 1 – State Location Map

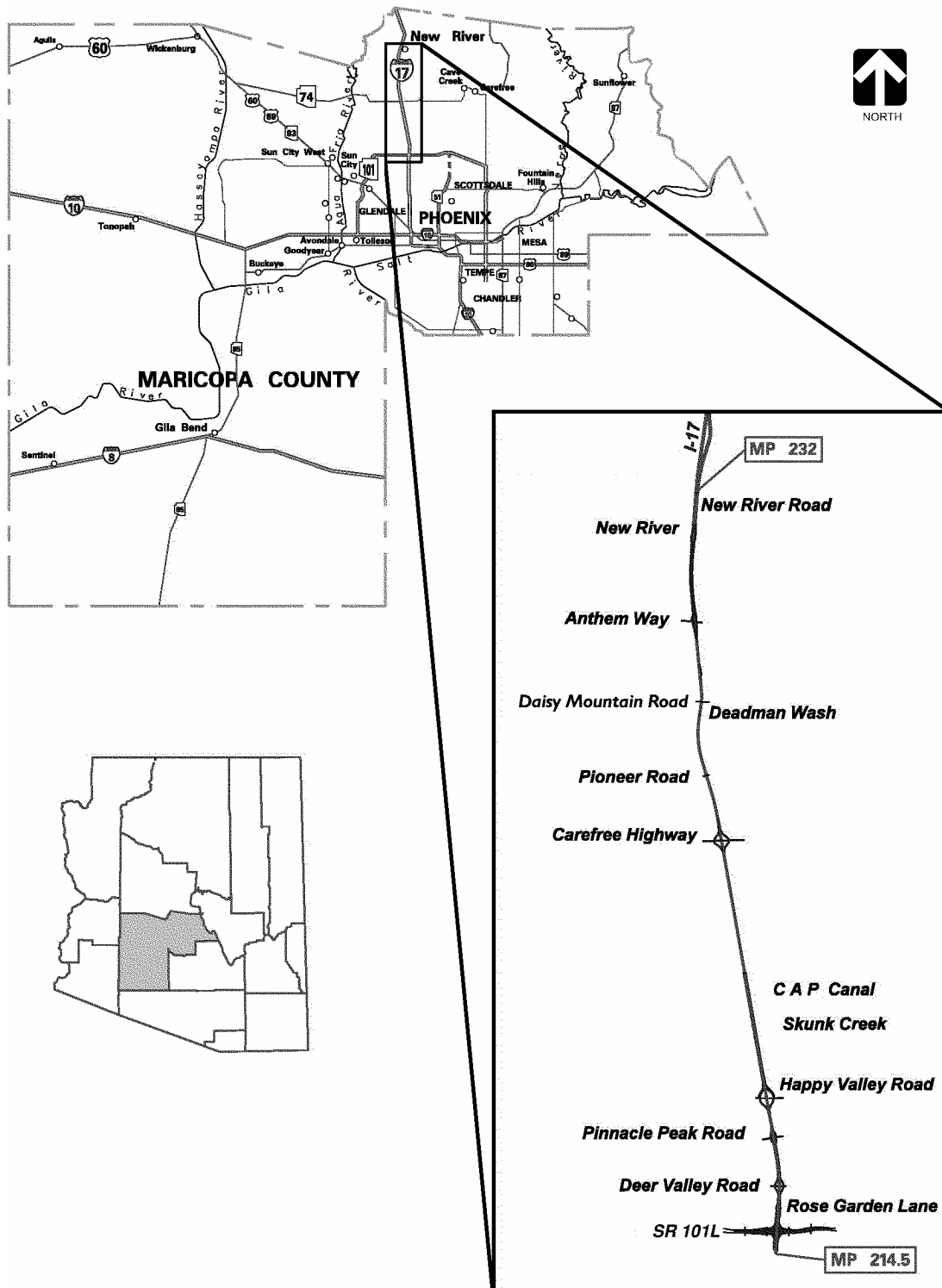


Figure 2 – Project Vicinity Map

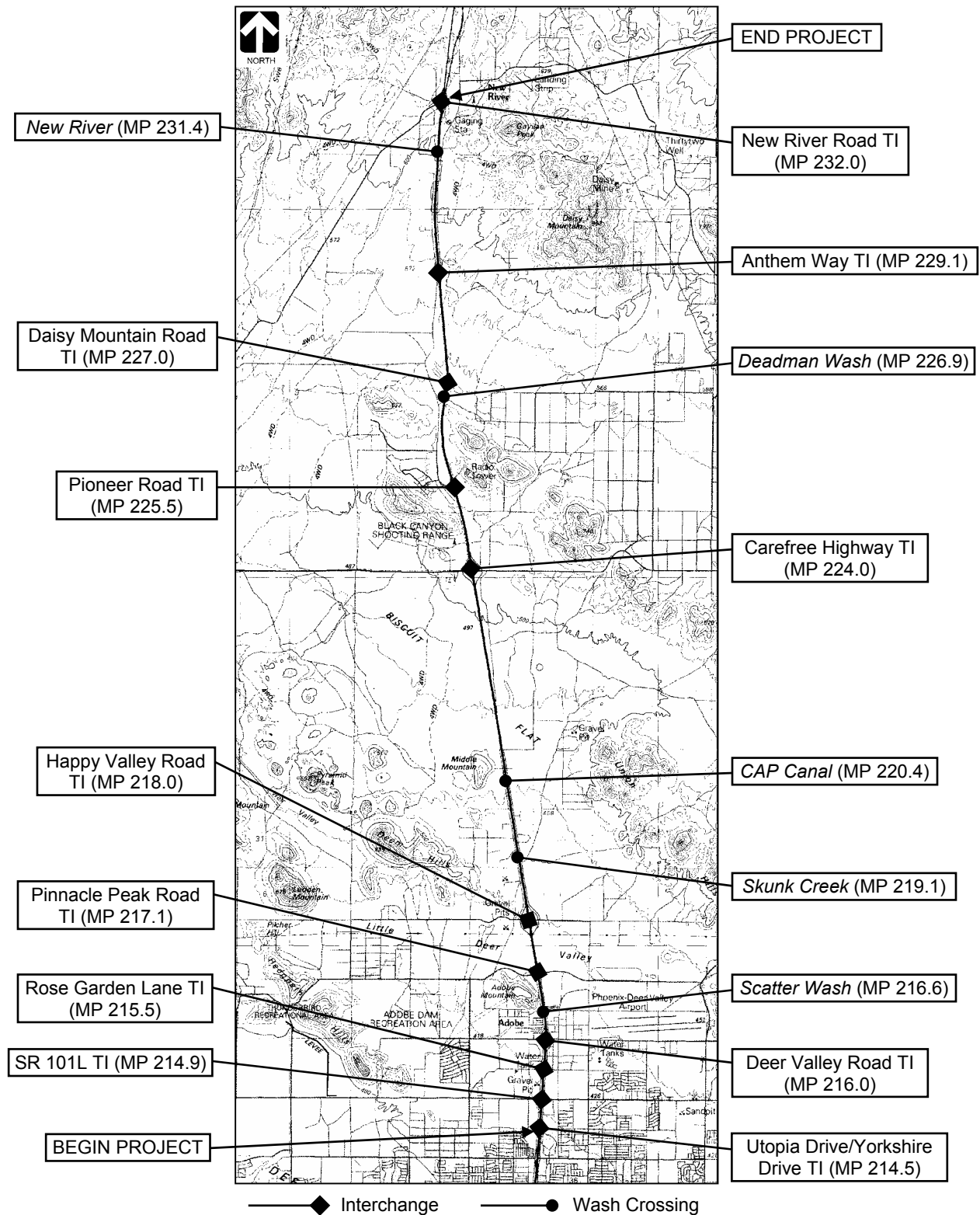


Figure 3 – Project Area Map



sections consisting of two lanes plus an HOV lane between the exit and entrance ramps. Southbound, there are currently two lanes plus an HOV lane and an auxiliary lane immediately north of Rose Garden Lane and through the main body of the TI, with short sections consisting of two lanes plus an HOV lane between the exit and entrance ramps. The east-south and west-south directional ramps combine and add three lanes to the existing two lanes plus HOV lane section for a short distance near Yorkshire Drive/Utopia Drive, tapering to four lanes plus an HOV lane to the south. Through the TI, travel lanes are 12 ft wide with 8-ft inside shoulders, 10-ft outside shoulders, and 2-ft offsets to the median barrier.

A frontage road system comprised of one-way and two-way roads are located adjacent to various segments of the highway, as follows:

- One-way frontage roads from SR 101L to Pinnacle Peak Road
- Two-way frontage roads from Happy Valley Road ending north of the CAP Canal
- A two-way roadway east of I-17 intersects Anthem Way and New River Road
- A two-way roadway west of I-17 extends north of Anthem Way and ends south of New River

Densely developed urbanized areas are located next to I-17 from the southern end of the project extending north to Scatter Wash. Less intensive development abuts I-17 north of Happy Valley Road extending to the CAP Canal. Open desert and several large recent residential and commercial developments characterize areas north of Carefree Highway. The alignment of I-17 traverses flat to rolling terrain within the study limits.

The speed limit on I-17 varies from 55 miles per hour (mph) at the southern project limit, to 65 mph north of Deer Valley Road, to 75 mph north of Happy Valley Road.

## **2. Traffic Analysis**

A traffic analysis was conducted to evaluate future traffic volumes. Traffic projections were developed using socioeconomic data from Maricopa Association of Governments (MAG), the regional metropolitan planning organization for the Phoenix area, to account for growth over the next 25 years. The planned roadway network used for this traffic assignment was developed using input from ADOT, City of Phoenix, and MAG.

At the time that the traffic analysis was conducted, the location for the proposed SR 303L corridor had not been formally adopted. Therefore, the analysis was performed to reflect the worst-case scenario in terms of future traffic volumes on I-17. To simulate worst-case regional traffic volumes on I-17, the analysis was performed under the assumption that the I-17/SR 303L TI would be located at the existing Carefree Highway TI. This assumption represents the worst-case scenario because it is the northernmost I-17/SR 303L connection that was considered. In this scenario, regional traffic associated with SR 303L would be required to travel the greatest distance on I-17 to reach SR 303L, resulting in the highest future I-17 capacity requirements of any of the alternatives considered.

Since the traffic analysis was conducted, the Lone Mountain Road corridor has been identified as the preferred route for SR 303L. In light of this decision, the project team recommended including five general purpose lanes plus an HOV lane continuing to the Carefree





Highway TI in order to provide adequate space to accommodate the I-17 mainline as well as the ramps and auxiliary lanes associated with the eventual construction of a system TI at Lone Mountain Road. Additional capacity on I-17 would likely be necessary in the vicinity of the I-17/SR 303L TI in order to accommodate traffic movements; this condition would be further evaluated during final design.

*a. Traffic Network and Other Traffic Improvements*

Considerable growth is anticipated in the study area and a number of other roadway improvements are planned to accommodate this future growth (Figures 4 and 5). Arterial street and highway improvements are planned by Maricopa County Department of Transportation (MCDOT), ADOT, City of Phoenix, and private developers. The planned roadway network includes:

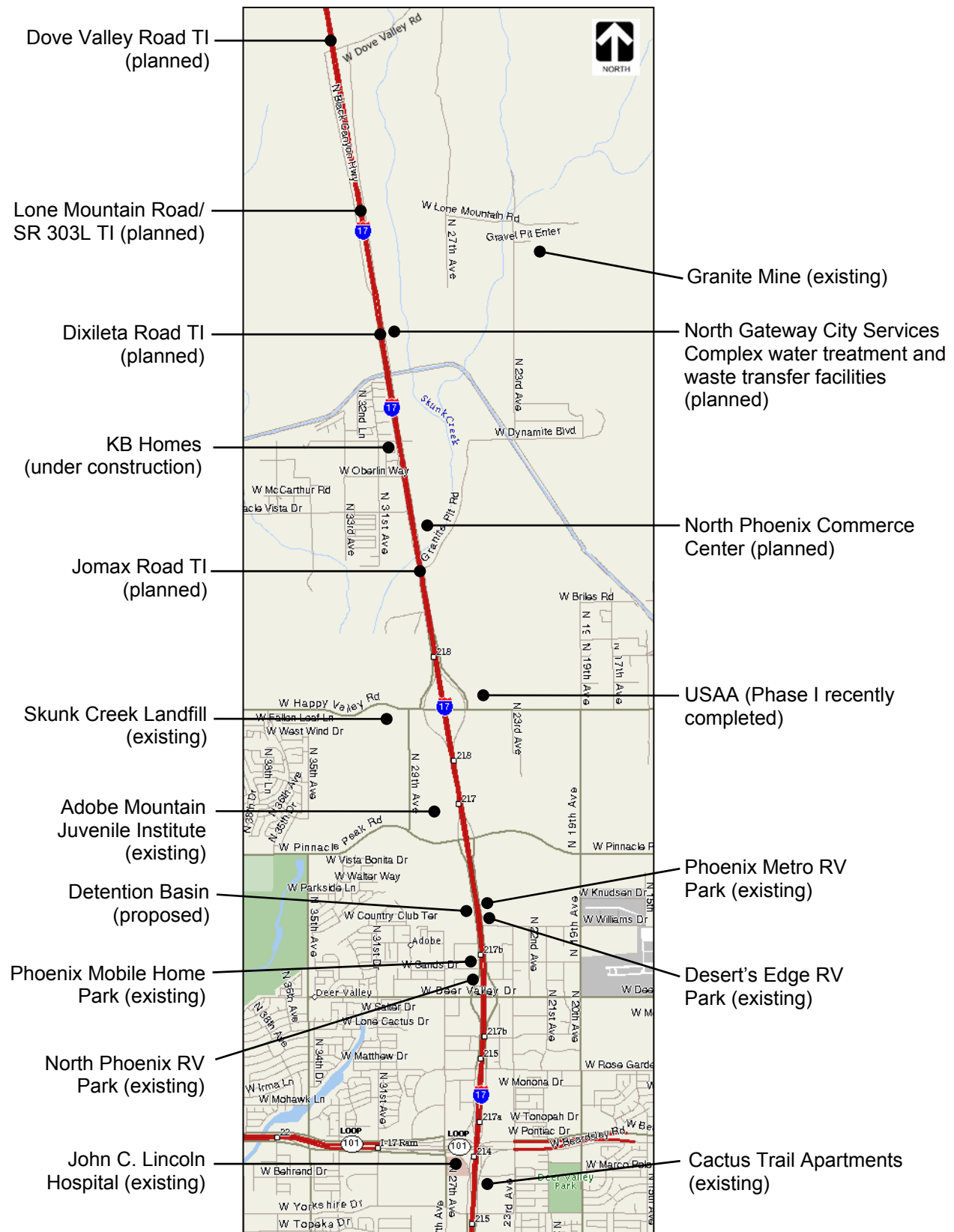
- New TIs between Carefree Highway and Happy Valley Road at Jomax Road, Dixileta Road, Lone Mountain Road, and Dove Valley Road (City of Phoenix)
- A TI currently under construction at Daisy Mountain Road to provide access to the Anthem development (private developer)
- Study of extending parallel frontage roads north of Carefree Highway (MCDOT)
- SR 303L corridor study for a new freeway loop connecting I-10 west of Phoenix with I-17 at Lone Mountain Road (ADOT/MCDOT)
- Carefree Highway improvements, including widening and access control, reconstructing the TI, and future development possibilities (ADOT/MCDOT)
- North Valley Parkway on the east side of I-17 through the new development areas (City of Phoenix)
- Widening of I-17 north of New River Road to Black Canyon City (ADOT)

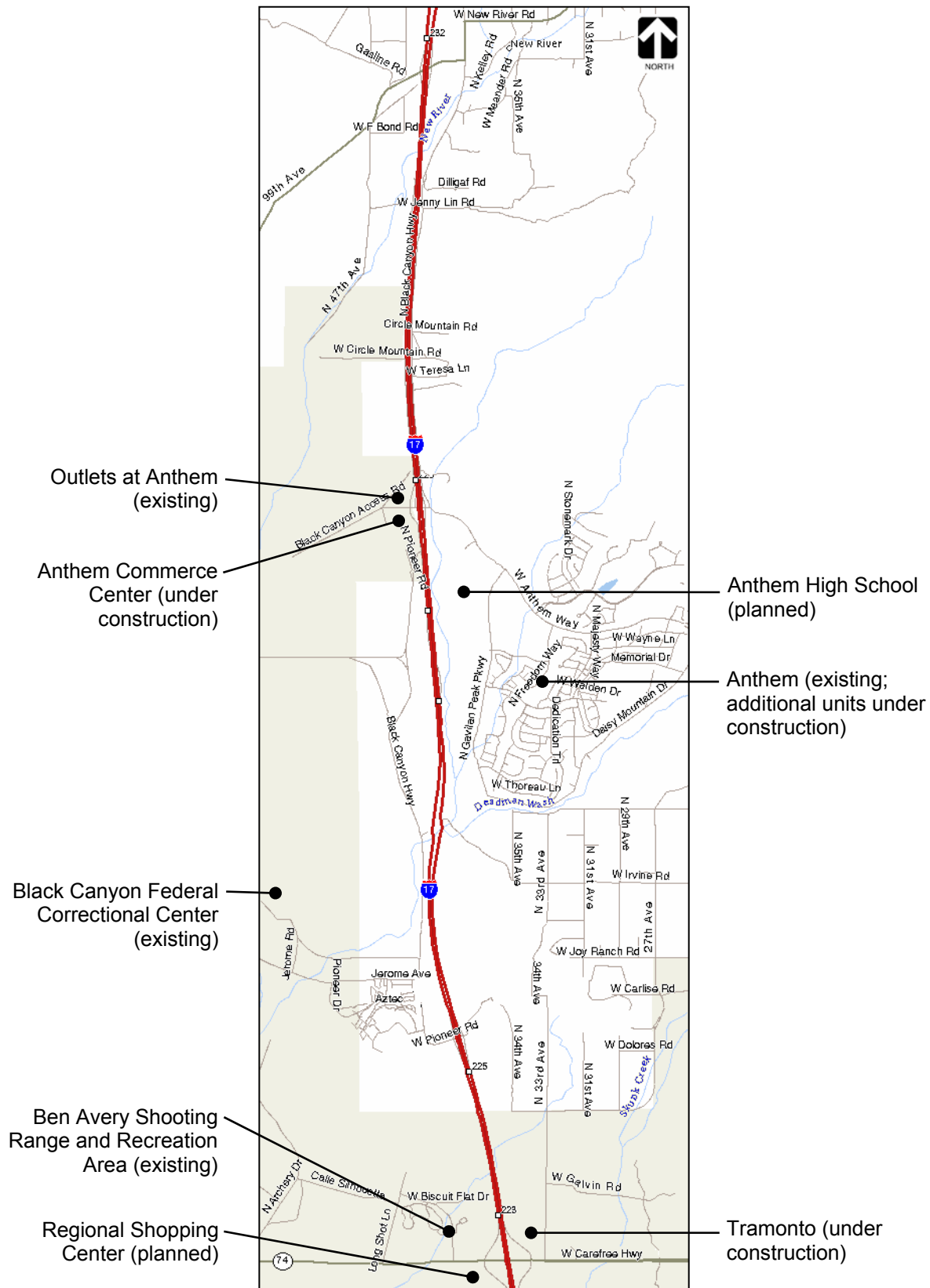
*b. Future Traffic Operations*

The future traffic growth and demands in 1999, 2020, and the design year (2025) were evaluated in the traffic analyses. ADOT projections for I-17 show that the largest increases in traffic growth are expected to occur in the urbanized areas south of Carefree Highway. The anticipated growth in average annual daily traffic (AADT) volumes, based on 1999 ADOT traffic counts and MAG forecasted traffic volumes for 2020, is presented in Table 1. Furthermore, the I-17 Traffic Forecast Report (ADOT 2000d) prepared for this project identified the rapidly changing character of the study area from a primarily rural area with the heaviest volumes caused by weekend recreational traffic to a developed urban area with the heaviest volumes during the weekday peak hours.

**Table 1 – I-17 Traffic Growth**

<b>Location</b>	<b>Existing AADT (1999)</b>	<b>MAG Predicted AADT (2020)</b>	<b>Growth</b>
At SR 101L TI	72,300	122,000	69%
South of Carefree Highway TI	55,300	114,700	107%
South of New River Road TI	31,100	58,200	87%





**Figure 5 – Existing and Planned Development (North of Carefree Highway)**





The results of a Level of Service (LOS) evaluation for existing conditions within the study area are shown in Table 2. LOS is a measure of traffic operations ranging from LOS A, representing optimal traffic conditions, to LOS F, representing considerable congestion and delays (Figure 6). LOS projections were calculated using traffic forecasts for general purpose travel lanes only, and do not take into account traffic forecasts or capacity available from HOV lanes, since LOS evaluation procedures are not applicable to HOV lanes.

**Table 2 – Existing Levels of Service**

Location	Direction	LOS (1999)	
		AM	PM
I-17 Mainline at SR 101L	Northbound	D	C
	Southbound	C	C
I-17 Mainline from SR 101L to Carefree Highway TI	Northbound	B	B
	Southbound	B	C
I-17 Mainline from Carefree Highway TI to New River Road TI	Northbound	B	B
	Southbound	B	B
Ramp Merging from SR 101L to I-17	Eastbound to Northbound	E	D

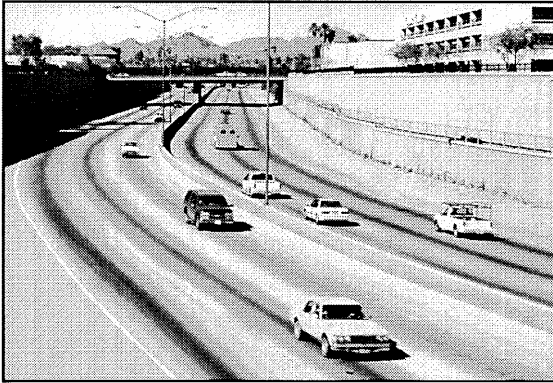
Table 3 shows the total number of general purpose lanes required on the I-17 mainline to achieve LOS C for predicted 2025 traffic volumes. Based on these data, the I-17 improvements have been developed to provide eight general purpose lanes north of Carefree Highway and 10 general purpose lanes south of Carefree Highway. This configuration would provide LOS C or better for predicted 2025 traffic volumes.

**Table 3 – Year 2025 Levels of Service**

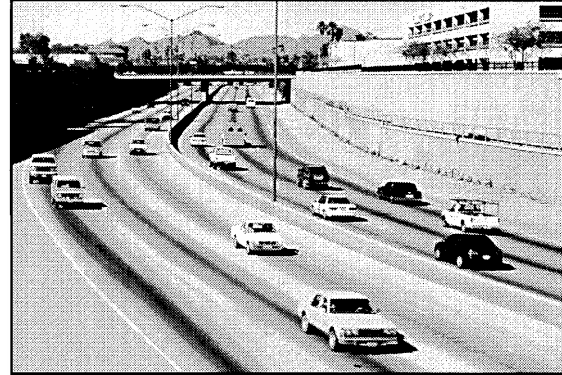
TI	Peak Hour Volume	No. of General Purpose Lanes Needed to Achieve LOS C
New River Road	2,700	4
Anthem Way	3,400	6
Daisy Mountain Road	4,400	6
Pioneer Road	5,300	8
Carefree Highway	5,400	8
Dove Valley Road	5,400	8
Lone Mountain Road	5,800	8
Jomax Road	6,200	8
Happy Valley Road	6,700	10
Pinnacle Peak Road	6,800	10
Deer Valley Road	7,200	10

### 3. Project Goals and Objectives

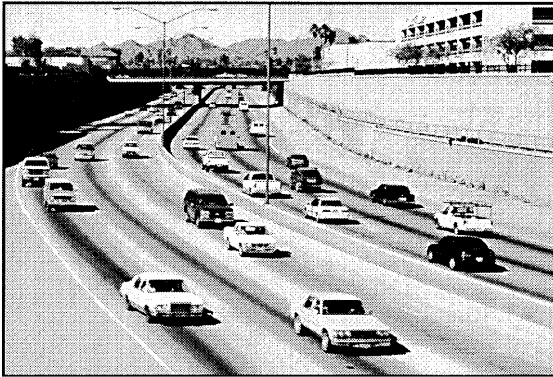
The existing roadway needs to be widened to reduce travel delays and congestion in the project area resulting from growing peak-hour weekday traffic demands and increasing recreational traffic. The proposed improvements and widening would provide greater capacity and improved traffic operations within the study corridor. Improvements to I-17 are needed to accommodate



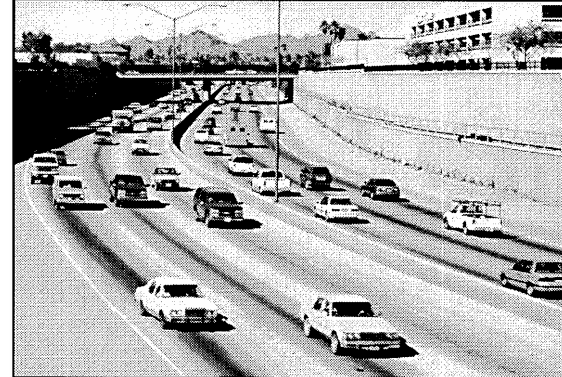
LOS A



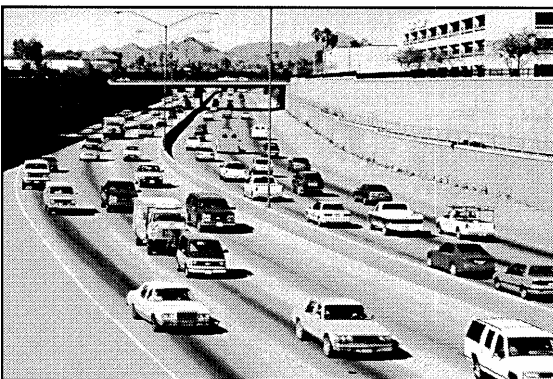
LOS B



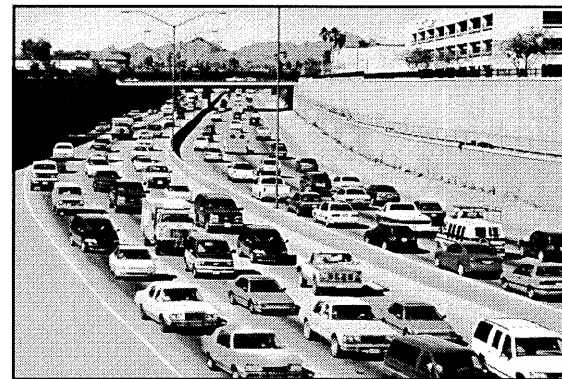
LOS C



LOS D



LOS E



LOS F

**Figure 6 – Traffic Level of Service Operations**



continued economic growth and expansion in the region. The project is being undertaken to alleviate congestion associated with increasing travel demands associated with the expansion of the Phoenix urban area and new commercial and residential development along the I-17 corridor. The widening would accommodate the anticipated influx of 100,000 more persons generated by new development in the area. Additional mainline capacity is also needed to meet increasing recreational demands associated with the rapidly increasing population.

The development of alternatives has incorporated input from the City of Phoenix, MAG, and Maricopa County, and considered future plans for development. The preferred alternative would include improvements to the existing discontinuous frontage road system south of Carefree Highway, in accordance with the City's plans for new interchanges. These frontage roads would provide access to the new interchanges and are proposed in accordance with the City, ADOT, and FHWA objective of separating I-17 traffic from local traffic. The frontage roads would also provide alternative access, allowing detours around the mainline in the event of emergencies, accidents, and highway closures. A continuous frontage road system would also provide improved access for bicyclists and pedestrians.

## **D. Conformance with Regulations, Land Use Plans, and Other Plans**

Existing land use plans were reviewed to determine if the proposed widening of I-17 would be consistent with current land use plans. These plans include the Maricopa County Comprehensive Plan, City of Phoenix General Plan, New River Area Plan, and MAG Long Range Transportation Plan (LRTP). The proposed widening of I-17 would be consistent with the development envisioned in these plans, and has been included as an element of MAG's LRTP, which addresses all modes of transportation through 2015. An update of the plan was completed in 2002 (MAG 2002a). The county transportation system plan is being developed in close coordination with the LRTP, particularly in those areas where the goals are similar, and requires close coordination regarding land use planning, preservation of existing transportation facilities, congestion management, and efficient financial programming to achieve regional connectivity.

## **E. General Project Schedule**

The design work for the I-17 widening from SR 101L to Carefree Highway is scheduled in ADOT's current Five Year Transportation Facilities Construction Program for Fiscal Year (FY) 2006 and construction of this segment of the project is programmed for FY 2008. Design and construction of the improvements to I-17 from Carefree Highway to New River Road have not yet been included in the program.

## **F. Issues Eliminated from Detailed Study**

Based on an analysis of the project area, there are no prime or unique farmlands, sole source aquifers, wetlands, wilderness areas, or wild and scenic rivers present in the project vicinity.

